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Miss Frances Phillips, Bruce Street School, Newark, N. J., demonstrates the apparent circular movement of stars. (See page 437)

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THE VOLTA REVIEW

ALICE DUNLAP, EDITOR

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THE ALEXANDER GRAHAM BELL ASSOCIATION FOR THE DEAF welcomes to its membership all who are interested in improving the education of the deaf and the hard of hearing, their ability to communicate with those who hear normally, and their adjustment to life in the hearing world. Its membership fee ($3 a year—$50 for life) includes a subscription to *The Volta Review*.

THE VOLTA BUREAU, headquarters of the Association, is an information center about deafness, founded by Alexander Graham Bell in 1887. Its library on deafness and speech is probably the largest in the world, containing books in twenty or more languages.

An Announcement Regarding Association Finances

AT a special meeting of the Executive Committee of the Alexander Graham Bell Association for the Deaf, Inc., held on October 9, 1953, it was voted that the combination subscription-membership fee be raised from $3.00 to $5.00 per year, effective January 1, 1954. Although such an increase was proposed by the Membership Committee several months ago, action was postponed until every possible means of increasing income and reducing expenses had been explored.

In addition to publishing the *Volta Review*, which appears ten times a year, the Volta Bureau carries on many activities on behalf of the Association and its members. Through its nonprofit publishing program it makes many books and pamphlets available which would not be issued by commercial publishers because of the limited market. It distributes many books of other publishers so that members can conveniently order from one central point. The Volta Bureau sends out approximately 30,000 pieces of metered mail per year, nearly half of which is first class. Over 1,000 free kits of information are sent each year to hard of hearing adults and parents of deaf children. Many requests for information come from students, teachers, speech and hearing therapists, hearing aid dealers, and doctors, as well as others interested in the hearing handicapped.

The John Hitz Memorial Library, of which all members can be proud, is located at the Volta Bureau. It contains probably the largest collection on deafness and speech in the world. The Volta Bureau also maintains a special lending library, for members only. The biennial Summer Meetings of the Association offer an excellent opportunity for discussion of the problems involved in the education of deaf and hard of hearing children.

How are all these and other services financed? The building was donated by our founder—Alexander Graham Bell. Dr. Bell and members of his family also provided a limited endowment fund. The Volta Bureau supports itself through the interest from this endowment fund, through contributions, and to a limited extent through its publishing program, including the *Volta Review*. The staff, reduced from eight to six people, receives some relief through the services of volunteer workers. Although expenses have been cut wherever possible, it has still been necessary to operate on a deficit budget.

The Executive Committee and members of the staff deeply regret the need for an increase in the subscription-membership fee. We are, as always, aware of the many financial demands made upon our members. It is our sincere hope that this increase will be temporary. The Finance Committee and other members of the Board of Directors are giving much time to the question of increasing income through other means. All of these people, incidentally, pay their own expenses in connection with Association work and with attendance at meetings.

The Volta Bureau, headquarters for the Alexander Graham Bell Association for the Deaf, is the only organization of its kind in the world. There is no way to measure the value of the work accomplished since its establishment in 1887. Those of us engaged directly in the work realize, however, that none of our goals could have been achieved without the interest and support of *every* member. What has been accomplished is ample proof that a relatively small organization, with a worthy objective and a dedicated membership, can make great gains. But much is still to be done!

I am sure that I speak for the Board of Directors in thanking all members for their support, and in urging that this support be continued in the future.

ALICE DUNLAP
EXECUTIVE SECRETARY

A Planetarium Visit

FRANCES I. PHILLIPS AND WALTER PETERSEN

DURING the past year a Spitz planetarium* was installed at the Newark (N.J.) Museum as a gift from Mr. and Mrs. Leonard Dreyfuss, stimulating a great deal of interest and curiosity among the children of the city. The deaf boys and girls attending the Bruce Street School in Newark were, of course, no exception. Only one problem prevented them from attending a planned school or public lecture which the educational department at the Museum provides for the Newark school children. The deaf can neither hear a lecture, nor is it possible in the darkened chamber for them to lipread. Yet after a demonstration of what wonders could be revealed through this new medium, teachers at Bruce Street School and Museum staff members alike were eager but perplexed to know how a planetarium performance might be made meaningful for the boys and girls of the School. The problem proved a real challenge to the ingenuity of everyone involved.

At first it was thought that if a light could be trained on the lecturer's face while he talked, the children would be able to lipread. However, this solution was impossible because the amount of light required would illuminate the necessarily darkened chamber, destroying both the night sky illusion and blotting out the pinpoint stars projected against the planetarium dome.

The thought was finally proposed that slides containing a simplified lecture could be prepared and, by means of a slide projector, flashed against the dome. The projection conditions would be ideal since the room had to be in almost complete darkness. After a slide was projected, it could be followed by the star projector and the particular astronomical phenomena or object indicated. This technique proved feasible and plans followed accordingly.

*Called a Spitz planetarium after its inventor, Armand N. Spitz, president of the Spitz Laboratories, Inc., Philadelphia.

Miss Phillips is a teacher at the Bruce Street School, Newark, N. J., and Mr. Petersen is a member of the staff of the Newark Museum.

Simplified Language Needed

The next problem was to simplify the language of the lecture and to bring it within the vocabulary and sentence structure range of the children who would attend. A group of teachers at the school was consulted. The classes under the guidance of these teachers were old enough to gain something of interest and stimulation from such a program. These children ranged in age from 8 to 16 years and were quite diversified in their interests as well as in their reading and comprehension levels. The teachers were most enthusiastic about the idea and immediately began exploring possibilities. They wished to know which astronomical concepts would be of most interest to the children and which ones would develop basic understandings related to the social studies and science programs. The staff at the Museum was consulted several times during the preparation period to work out exactly which concepts were feasible. From these discussions an outline was made of what might be included on the slides, and the direction of the lecture was planned with these points in mind.

The children developed new interests. One group had recently been introduced to the concept of direction and was learning the cardinal points of the compass. In order to make this more meaningful, the members of the class were supplied with individual compasses which they used in class and then took home each night so they might do further experimenting. A lipreading lesson one day was based on the Indian legend about the Big and Little Bear. That evening every child in the group searched for the North Star. During the actual lecture their comprehension of direction was further expanded.

Other areas in which better understanding could be immediately made meaningful

through consideration of the coming performance were the interpretation of maps, conceiving the meaning of large numbers, and expanded interest in the field of nature study. In addition, each of these and related topics quickly became of major interest to the children around which speech, lipreading, language and reading lessons could be built.

Slides Prepared

The committee of teachers, while outlining the lecture, took particular note of the questions in the field of astronomy in which the children had shown curiosity. The next task was to organize and express these ideas in such a way that the children could understand and read them with comparative ease and rapidity. In about three weeks the final form of the lecture was evolved. A single concept was presented on each of the slides. Some of the sentences were very simple, some more complex. A few examples are included here.

Slide I: There are many, many stars in our sky. Our sun is a star too. In the evening, when the sun goes down, we see the stars.

Slide VII: Venus is one of the planets. We call it the evening star because we see it early in the evening. Venus is between the earth and the sun. It is smaller than the earth.

Slide XXLII: Orion is the Great Hunter. The stars in his constellation show his belt, his sword, his shoulders, and his knees. He is holding a club in his hand above his head.

Trippensee Planetarium

In the meantime the children and their teachers were becoming increasingly interested in the subject of astronomy. A number of reference books were borrowed from the Newark Public Library. The Lending Department of the Newark Museum supplied a Trippensee planetarium from its collection of three dimensional objects showing the sun and rotating earth, the moon and the planet Venus; the Department of Audio-Visual Education of the Newark Public Schools lent the school several excellent sound motion pictures among which were *The Moon, The Earth and Its Neighbors, What Makes Day and Night,* and several others. A number of mounted pictures were borrowed from local libraries. All of these aids to learning were used in the various classes to stimulate discussion and to clarify concepts. Several copies of *Stars* by Herbert S. Zim (Simon and Schuster, 1951. $1.50 cloth; $1.00 paper) were purchased at the Museum's sales desk for the use of the children and teachers because the excellent color illustrations stimulated discussions and questions. The majority of the children were also supplied with *Star Explorer Maps* (Junior Astronomy Club, Hayden Planetarium, New York City, 1952, 25¢) to help them in home study. Over $20.00 was spent one day at the Museum to purchase these materials.

Photo by Almon W. Johnston, Newark

Samuel Berliner, a teacher at Bruce Street School, is pictured using a Trippensee Planetarium from the Newark Museum Lending Collection to clarify an astronomical concept.

What activity resulted! Even the sky and weather man cooperated to increase enthusiasm, for just at that time the children were able to see a lunar eclipse and the planets Jupiter, Mars, Venus and Mercury lined up in the southwest evening sky. Reports of the condition of the sky were, of course, paramount subjects for conversation. One child told her parents she just couldn't go to bed at eight o'clock that night because she had to look again at the sky at eight-thirty: "teacher's orders." Sometimes morning news reports were given of coming astronomical events or observations made of the sky the previous

evening. During speech, new words were added to the children's vocabularies and the meanings of these words were carefully developed. One class read typewritten "Stories about the Stars" especially written for them by the teacher. Questions, discussions and self-expression periods including language and art work followed.

Umbrella Demonstration

The concept of the circumpolar stars was found to be difficult to explain, and a visual device was found in Gaylord Johnson's book, *Discover the Stars* (Sentinel Books, 1944, 60¢: Pgs. 9-16). A miniature sky map of the northern circumpolar constellations was drawn on the inside surface of a black umbrella, the stars being located by white dots. When placed at the proper angle over the edge of a table, the umbrella was then rotated to show the apparent motion of the stars during a 24-hour period. The result would probably not meet with the approval of an astronomer, insofar as exactness is concerned, but it did the trick of putting the concept across to the class. In the Bruce Street School no one is likely to have a good teaching device for very long before it is passed around. Very shortly each class had borrowed the umbrella and used it to clarify the circumpolar concept.

Slides Typed on Radio Mats

The slides were typed on radio mats and bound by a class of the older boys. Etched glass was used for both covers in order to reduce the amount of light projected through the slides. Ordinarily slides are bound between clear glass covers so the maximum amount of light is used in projection. In this case, it was considered more feasible to use a smaller amount of light so the adjustment of the eye muscles would be minimized between reading the projected material and seeing the stars on the planetarium sky. A slide projector was properly mounted in the planetarium so the slides could be flashed on the dome at about a 45-degree angle. The projector itself had to be encased in a box to eliminate extraneous light. A slide was shown, the lecturer used his red arrow pointer flashlight to call the children's attention to it, then the slide projector was turned off, the star projector turned on and the particular star, constellation or phenomena explained in the slide pointed out. A total of 29 slides were shown in 45 minutes, which is about the regular length of a planetarium performance.

On the day of the Museum trip, several parents were included in the group. The performance was attended by 44 boys and girls and 14 adults, including teachers. Parents were especially interested as the planetarium performance had for some time been a major topic around which conversation had been built at home as well as in the classroom. The parents, including two deaf mothers, were surprised to note their children's knowledge of astronomical matters. During the lecture interest was at a high pitch, made apparent by the periodic silences and delighted gigglings and squirmings—ample proof that the children really understood and that they were enraptured. Well they might be, for a planetarium performance is a unique experience as well as a visual aid. Of course the vocabulary used on the slides and all of the concepts included in the lecture had previously been presented to these young people so that they would be familiar with the material. Actually the only new experiences were being in the planetarium chamber and the form of the reading material as it was expressed on the slides. This was newness aplenty, but of a sort to delight rather than to confuse. The planetarium at the Newark Museum consists of a special circular room constructed on the first floor of the main building with a seating arrangement for 100. The projection instrument is in the center of the room. Overhead is the domed fabric ceiling 24 feet in diameter and 18 feet high, like a huge opened parachute. Around the base of the dome, the skyline of Newark as seen from the roof of the Museum appears in silhouette. During the performance the lecturer sits at the console, in the center of the circle of spectators. This performance was typical of the regular ones in that the sky tour began in the last dusky-pink and gray afterglow of twilight. Gradually the last light faded from the sky and, as in nature, the stars appeared slowly, the brightest or first magnitude stars becoming visible long before the fainter ones, until

in a matter of minutes the domed ceiling was filled, fashioning on the planetarium sky a true reproduction of a night sky one might see from the top of a hill in the country—a sky totally clear, cloudless and dust free.

In addition to the actual performance the children were able to see the planetary models and other exhibit material outside

Courtesy of the Newark (N.J.) Museum

Mrs. Eleanor Lawrence, Bruce Street School teacher, points out "What Causes the Seasons," one of the three-dimensional models outside the Newark Museum Planetarium.

the planetarium chamber in an exhibition, "The Stars and Planets." This material has been designed especially to interest young people and to be comprehensible to them. It consists of attractive three dimensional models showing eclipses, moon phases and planets, as well as a star map changed with the seasons. Reproductions of color photographs of a solar eclipse, as well as transparencies of Halley's comet, planets and nebulae, are included with interesting label material.

Immediately after the performance the children showed great interest in this exhibition. A small meteorite, which is part of the material shown, was of special interest to the teenagers in the group. They wanted to know how much it weighed and were surprised to learn that, though in size it was not much bigger than a football and heavily perforated, the object was metallic and weighed well over 100 pounds. They also asked where it came from, touched it, and continued to insist—because of its appearance—that it looked light.

Directly after the performance some of the children asked questions about the instrument used to project the stars and about celestial concepts discussed in the performance. Staff members at the Museum have had considerable experience with children's groups and great friendliness prevailed. These children—like all who come to the planetarium—were especially interested in the weird projection machine.

The day was completed to the satisfaction of all by luncheon parties at two local restaurants in which parents, teachers and children were included.

Children Make Return Visit

At a public performance a few days later, some of the older children returned for another show, expressing disappointed surprise to the lecturer afterwards that the show was different. "What's the matter?" they asked. "No slides. We could not see your lips when you talked."

During the following week the trip was used to inspire further creative expression in the classroom. Pictures were drawn and stories were written by the children. Notes of appreciation were sent to staff members at the Museum who had helped in this project. These activities also provided opportunities for reading, speech and lipreading, based on material which was of considerable interest to the boys and girls.

The venture was certainly worthwhile for it opened possibilities for new avenues of interest to the young people; new experiences and new concepts which they would not otherwise have been able to acquire. As far as we know, it was the first time a planetarium lecture was made understandable to deaf children.

Such an effort—cooperation between the Newark Museum and the Bruce Street School—indicates the value of an organization alert to the possibilities of using its resources for all the citizens. Imaginative and versatile educators have made similar use of the Museum facilities in the past. This planetarium performance in particular emphasizes the interest a Museum, with its essentially visual offerings, can have for everyone and in particular its wealth of material for deaf children.

Pure Tone Audiometry With Young Children

A Procedure for Detecting Small Losses of Hearing

MARGARET EMPEY

THE need for a satisfactory method of testing the hearing of children under five years of age has long been recognized by all interested in hearing and its conservation. Since the standardization of pure tone audiometry about fifteen years ago, its use with young children has been viewed so generally with misgivings that pure tone testing of children under the age of five years has been considered unreliable or even impossible.

Within the past few years speech audiometry and galvanic skin-resistance audiometry have been standardized. Speech audiometry gives valuable information when used in conjunction with pure tone audiometry, but when used alone fails to give a graphic picture of the hearing threshold which is so invaluable in a conservation of hearing program. In a few highly specialized hearing centers, the galvanic test is being used successfully on children under two years of age, but it is far too technical for general use.

The pure tone method of testing remains the best practical and scientific means of detecting hearing losses. Since it affords the most usable tool available at the present time, refinement of procedures in its administration would appear to be the means of expanding case-finding among children under five years of age.

The child from two to six years is at a peak in the learning of communication skills. A hearing loss of sufficient magnitude to interfere with normal learning processes at this time will retard the child in psycho-social areas as well. But just as important, and certainly much more difficult to detect, are the small losses among children in this age range. It is these minimal losses that are so frequently overlooked, and it is here that conservation of hearing from the standpoint of case-finding meets its greatest challenge.

Accurate pure tone audiometry on children under five years of age is a relative matter. The degree of success is dependent upon several factors, each related to the other but at the same time each a separate entity. For purposes of facility, these factors might be divided into four categories:

Four Categories

1. *Intelligence.* Of great importance is the child's acuteness of reception, not from the standpoint of hearing, but from the standpoint of understanding directions and responding in an appropriate manner.

2. *Social Maturity.* The emotional maturity of the child will determine the degree to which he is able to accommodate to a give-and-take situation.

3. *Cooperation.* The establishment of rapport between the child and the technician will overcome natural fear of strangeness and will stimulate interest and a desire to participate.

4. *Audiometric Technique.* Certain devices and methods have proved valuable in attaining an accurate audiogram.

Within the inter-relationship of these four factors lies the success of audiometry with young children. The first two factors may be more or less fixed insofar as a given test is concerned. A certain degree of intelligence and emotional maturity is necessary to make an accurate test. However, in borderline cases, it is possible for the technician to determine the hearing threshold by obtaining the cooperation of the child and by using good audiometric technique. Judgment in the areas of intelligence and emotional maturity should be held in abeyance pending qualified psychological opin-

Miss Empey is audiometric technician for the Seattle Public Schools, Administrative and Service Center, Seattle, Wash.

ion. If psychological services are available, much valuable information can be given the audiometric technician.

Establishing Cooperation

Cooperation can be stimulated by motivating the child to participate. A friendly, positive attitude on the part of the technician can give the child assurance and confidence. Preliminary explanation of the listening game, giving details of what he may expect to hear and what response is expected from him, reassuring him that it is a game that will be fun, will help in the establishment of cooperation. It is well to keep in mind that fear may be very disturbing to the young child who is brought to a strange office for a first hearing test. If there have been earaches, with visits to the doctor, memory of pain and discomfort may cause negativism. Obviously it is of paramount importance to give early assurance to the child that nothing will hurt him and that all you are going to do is play a listening game. The sooner this is made clear to him, the closer the technician will be to establishing cooperation. Having Mother remove her coat before she removes his, besides having Mother accompany him into the testing room and possibly participate in the game first before the earphones are placed on his head, will go a long way toward promoting a sense of security in the new situation.

If the child objects to the earphones, disconnect one from the headpiece and hold it to his ear, demonstrate a stimulus likened to a train or boat whistle, and ask him if he hears it. Then explain, at his language level, the purpose of the headpiece—it is used so that his arm, Mother's arm, or the technician's will not get tired holding the phone to his ear while he listens. Interest can be stimulated by comparing the phones to those used by an airplane pilot or a telephone operator. Usually after such explanation, the child will submit to the phone's being place on his ear. If not, fear will be so distracting that an accurate test cannot be attained upon the first attempt. If such a stalemate is reached, it is desirable to drop the process and allow him to leave with as pleasant a memory of the first interview as is possible. Another attempt to test him should be arranged for the future.

The technician may be placed at a disadvantage by a remark made by the parent in the presence of the child. This is not common but does occur frequently enough to deserve mentioning as it must be reckoned with in the light of the effect upon the attitude of the child toward the testing process. Some typical remarks are: "I know he hears because he hears everything he isn't supposed to." "He doesn't want to hear me when I call him while he is playing." "He turns the radio up so loud that his father and I can't stay in the room." "He hears all right when he wants to but he doesn't pay attention." "I didn't tell him where we were going because I was afraid he would act up." Such statements in front of the child may contribute to negative motivation and increase the problem of cooperation.

Unfortunate as these comments may be, they shed some light on the attitude of the parents toward the child and often reflect a preconceived parental opinion on the hearing status of the child. Usually, they are stimulated by a desire to be helpful and/or by a lack of understanding of the relationship of sound to distance. The technician is in a position to help by giving such parents some understanding of the effect of distance on hearing. A hearing loss can be demonstrated readily to a parent.

Audiometric Technique

Technique applies to the actual methods used in making an audiogram after cooperation has been established. Some technicians have the child use the hand response —hand up when the sound is heard and hand down when it is no longer heard. Others use the push-button signal response. Objections to these methods appear obvious in that both require additional thought and coordination and would be distracting to the young child. The type of response which is most natural is a nod or shake of the head, or in some cases a verbal yes or no. Some technicians ask the child to close his eyes when listening. However, it is vital that attention and interest be kept at a maximum throughout the test and their retention appears to be easier when the child is looking directly at the technician.

The first problem may be one of conditioning the child to respond affirmatively

when he hears the sound stimulus and negatively when he does not hear it. He must understand the difference between "Yes, I hear," when he is able to hear and "No, I do not hear," when he is not able to hear. The process of listening, thinking, and responding adequately may be confusing to him, and if so a yes-no confusion will result. Such a child can be conditioned with effort. This may be done at any frequency with sufficient intensity to enable him to hear easily. Say, "Listen and you will hear a train whistle." Immediately present the stimulus and say, "There it is, do you hear it?" When he nods or says yes, then say to him, "Listen hard because soon the whistle will go away and you will not hear it any more." At this point interrupt the tone and say, "There, it has gone away and you can't hear it any more, can you?" Wait for his negative answer and when this has been elicited say, "Listen again and soon the whistle will come back. You tell me when you can hear it again." This procedure may be repeated at several different frequencies until the technician is certain the child understands what is expected of him. Care must be used to guard against the transition of a yes-no confusion to a yes-no pattern. This is a very real danger during the conditioning period and is a patterned response brought about by the use of poor audiometric technique. The possibility of a yes-no pattern response can be eliminated by the random spacing of tone interruption. During the conditioning process and often throughout the entire test, the technician can react with the child, nodding or shaking the head according to whichever response is given. This will promote security and will stimulate interest by reinforcing the child's confidence in his own ability to respond accurately and by carrying out the idea of dual participation in the game.

The technician must be vigilant not to register displeasure by facial expression or by attitude toward a negative response. As much of a feeling of success should be stimulated by a "No" response as by a "Yes." The only attitudes of displeasure registered by the technician—and this should be one of disappointment—would be when it is demonstrated beyond reasonable doubt that the child is guessing. If displeasure is registered, it should be definite but should be followed immediately by an experience with high success value. This can be accomplished by increasing the intensity to a point where it is known the child can hear. Guessing may be an expression of a desire to please. The technician may have placed overly high success value on an affirmative reply or may have over-stressed the fact that he often turns the sound off in an attempt to fool the child. The latter seems to confuse the young child and may result in guessing. Voice inflection, facial expression, arm or body movements of operation may give undesired cues and must be carefully disciplined in good audiometric technique.

Condition Children to Listen

Up to this point, conditioning has been limited to sound that has meaning and that can be heard easily. The child must now be conditioned to listen to a very small sound, one that he can just hear. Use the same stimulus which you have likened to a train whistle, then tell him that he must listen very hard and tell you if he can still hear it. There is much opportunity for stimulating childish imagination by comparing the different frequencies to meaningful sounds of everyday life. For instance, the boat might be at the dock when the whistle is loud and could be leaving the dock and going away as the whistle gets harder and harder to hear. The technician should try such technique, as it has great appeal. By decreasing the stimulus in steps of from five to ten decibels until the child says he no longer hears, then by increasing it to a point where he again says he hears, and by decreasing it again, a tentative threshold can be recorded. This tentative evaluation will again be checked during the testing of the opposite ear. Frequent assurance should be given during the test by telling the child that he is playing the listening game very well.

After establishing a tentative threshold at all frequencies in one ear, a rest period is recommended. The need for a rest may be evidenced by lagging attention and by tiring before the tests of one ear are completed. If such is observed, it should be heeded. Tell the child that a rest will be taken after which he will go back and

listen with the other ear. Remove the headpiece and allow him to walk around, to look out the window or to amuse himself otherwise. Often he will desire to talk about the different sounds he has been hearing. He has learned to some degree by now that he must really listen and think before he answers and that guessing will not bring success.

If Mother's presence has been required in the testing room during the conditioning period, it could be suggested that she remain outside while the technician and child return to listen with the other ear. However, if objections are raised, it is best not to insist. Seldom are objections encountered if this suggestion is presented in a friendly, positive manner.

While replacing the phones on the child, the technician should remind him that he must listen very carefully to all the little noises that he will again be hearing. The interrupter or turn-off key is invaluable when changing frequency as well as when using the attenuator or volume control. The judicious use of these devices keeps mechanical noise at a minimum and obviates the chance of response to mechanical noise rather than to the sound stimulus. The interrupter key increases in value as threshold is approached. Continuous sound at threshold is difficult to hear, especially for the young child. Hearing at threshold might be compared to vision. For instance, imagine you were asked to pick out a white rabbit known to be sitting on a snow bank some distance away. As long as the rabbit remained motionless you probably would not be able to see it, but the moment it moved you would immediately be aware of it. So it is with sound at threshold; unless it is moved or interrupted there may be no awareness of its presence.

Present each frequency at a comfortable listening level and attenuate to a threshold, then present it in the opposite ear at just a little above its tentative threshold value and attenuate to threshold. In this manner, tentative threshold values may be verified or changed. Seldom is the young child cognizant of the change-over from ear to ear at low intensity. It has been found that calling attention to this change-over tends to confuse and distract him. Thus, each frequency must be presented sufficiently loud to enable him to hear readily and then jockeyed into threshold position. By use of the change-over key, checking and rechecking, an audiogram within the margin of acceptable variability can be recorded.

Summary

The success of pure tone audiometry on the young child is commensurate with intelligence, social maturity, cooperation, and the technique used in administering the test. Attention has been directed to the interdependency of all four factors, of the intangible and the tangible. It has been pointed out that intelligence and social maturity, which may be intangible, present more serious and less easily regulated problems and may require repeated evaluations before an accurate audiogram can be charted. Cooperation and audiometric technique, on the other hand, are tangible and can be regulated. Their refined application, although time-consuming, can bring about a higher percentage of accurate threshold tests on young children.

NEW HEARING CONSERVATION CLASS

A hearing conservation class has been established for the public school children of Arlington County, Virginia. The class, which opened on September 8, is the first of its kind in the public school system of Arlington County. The new course will be taught by Elizabeth Hay, who taught the same program last year in the Bancroft School, District of Columbia. Miss Hay will be assisted by Rose Feilbach, Arlington County hearing conservationist. Provision has been made to teach a maximum 12 pupils. Each child will have a home room with hearing children, and will attend the hearing conservation class as long as necessary. Each student will have an individually adjusted hearing aid and special emphasis will be placed on lipreading and auditory training.

Star-Lit Lanterns —A Christmas Playlet

FRANCES MCLEOD

THE LITTLE playlet, "Star-Lit Lanterns," was written for children enrolled in the Hearing Class at Lincoln School, Santa Rosa, Calif. Seven children took part in the performance, which was given for parents last year at the close of the school for Christmas vacation. The "Actors" range in age from six to nine. Five have a severe hearing loss and two are hard of hearing. The playlet proved to be extremely valuable for speech work.

For the most part, this was the children's show. They made the lanterns themselves out of tin cans, punching star-shaped holes in the sides and two larger holes on one side, at top and bottom, into which they inserted a curved willow bough for a handle. The children even helped to make the candles, using ice cream cups as molds.

Like little troupers the children played the bells (a xylophone). The score was very simple and they used only one hammer. Because the names of the keys were stamped on the bells it was quite easy to "read" the music simply by having the corresponding letter of each key written above the musical staff.

We kept the properties at a minimum. Each child wore a shiny star on his forehead. The star was cut from tinfoil and stapled to a silver ribbon.

To the rear of the stage were a few pine branches and other greens; to the front were two stands . . . one to support the bells, and the other to hold the lighted lantern of each child as he played.

Among the pine boughs at the back, hidden by a fold of curtain, was a crayon sketch of the Baby in a manger, blue sky with a large star and a few smaller stars. This scene, drawn on thin paper, was effectively lighted from behind by two electric bulbs. As Diane finished saying, "There's the Baby over there," two of the children pulled aside the curtain.

But now the play was about to begin. The front curtain was closed. Just then

Six members of the cast of "Star-Lit Lanterns," played by pupils of the Hearing Class at Lincoln School, Santa Rosa, Calif.

one incident occurred which bears out the statement that this was indeed the children's show. Lee, one of the hard of hearing boys, slipped out in front of the curtain, and with great pomp and assurance announced the play. This was entirely unrehearsed, his own idea, and perhaps not such a bad one.

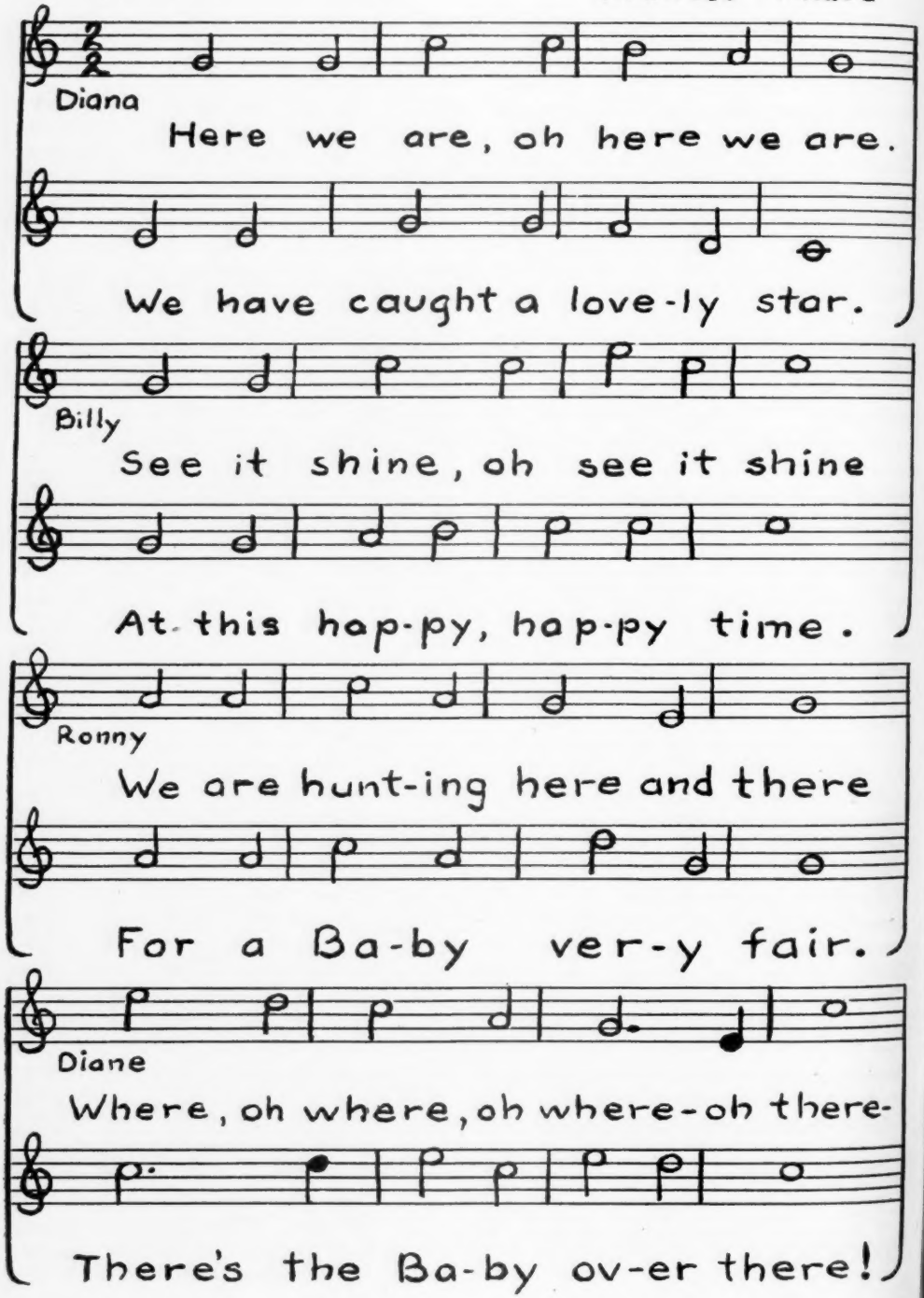
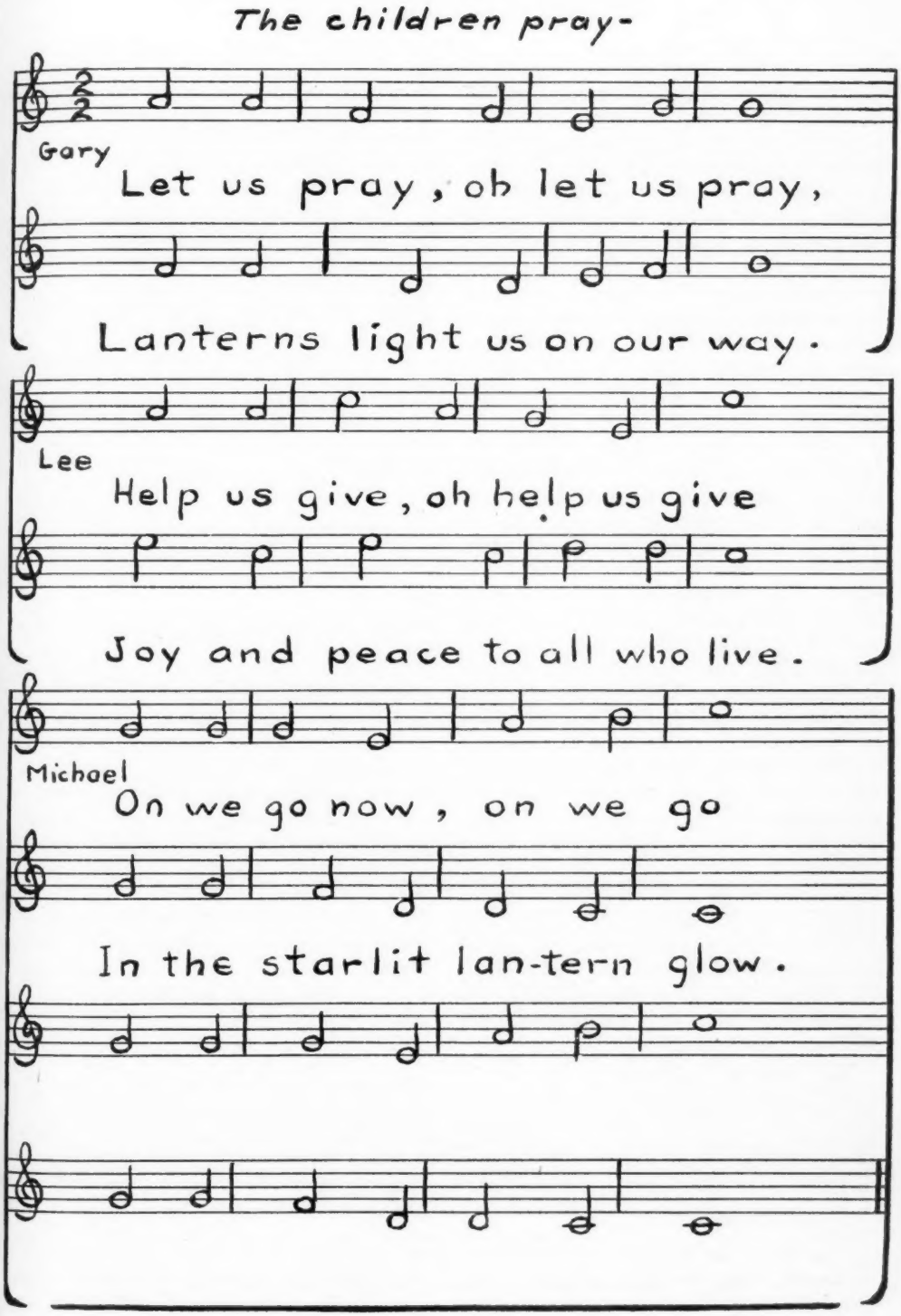
Diane came in first, and while she played the others marched in with their lanterns. Each played his bit of music and spoke his part. They raised their lanterns when Billy said, "See it shine. . . ." They looked about when Ronny said, "Where, oh where . . . ?" They found the Baby when Diane said, "There, oh there. . . ." Then, setting their lanterns on the ground, they knelt to pray as Gary said, "Let us pray . . . ," and Lee added, "Help us give. . . ."

Then, picking up their lanterns, the children stood while Michael played, and almost sang, "On we go. . . ."

On they went, Michael repeating the music until the last start-lit lantern flickered away. Then Michael picked up his lantern and followed.

Miss McLeod is a teacher of the Hearing Class at Lincoln School, Santa Rosa, Calif. In addition to writing and producing this Christmas playlet she also did the art work in preparing it for publication. The playlet was accepted by the *Volta Review* early this year, but because of its seasonal interest publication was delayed until a time when teachers would be working on their 1953 Christmas programs.

STAR-LIT LANTERNS

Frances McLeod

Diana
Here we are, oh here we are.
We have caught a love-ly star.
Billy
See it shine, oh see it shine
At this hap-py, hap-py time.
Ronny
We are hunt-ing here and there
For a Ba-by ver-y fair.
Diane
Where, oh where, oh where-oh there-
There's the Ba-by ov-er there!

The children pray-
Gary
Let us pray, oh let us pray,
Lanterns light us on our way.
Lee
Help us give, oh help us give
Joy and peace to all who live.
Michael
On we go now, on we go
In the starlit lan-tern glow.

"Children's Auditory Test"

THE "Children's Auditory Test," a new recording being distributed by the Volta Bureau, was developed by Mrs. Edna K. Monsees, Washington, D.C. Mrs. Monsees is director of the Hearing Rehabilitation Center and consulting audiologist to the Hearing Clinic of Children's Hospital.

The recording is designed to serve essentially the same purpose in testing the hearing of young children as is served by the CID Spondaic Word Auditory Tests for older children and adults. It is to be used for speech reception threshold measurement with a speech audiometer.

In her work Mrs. Monsees is frequently called upon to test the hearing of young children three and four years of age as a part of the general diagnostic examination of many children, including those whose behavior deviates from normal, who do not talk or who have seriously defective speech, who are so crippled orthopedically that they have difficulty signaling in pure tone audiometry or who are convalescing from deafness-producing diseases. According to Mrs. Monsees "every clinician called upon to test such children has worried about the validity of the pure tone audiogram. Often a number of retests are necessary before the clinician can feel any degree of assurance that he has obtained accurate threshold measurements."

In order to meet the need for a speech-reception test to supplement the pure tone audiogram with such children, the author developed the recording about a year ago. Since that time its reliability for its intended purpose has been established to the author's satisfaction.

The "Children's Auditory Test" is a 78 rpm, 12-inch recording at constant intensity, made of pure unbreakable vinylite. On each side there is a set of hearing test words as well as a band of random noise.

Side I—Toys

Nine words are used in this test: baby, duck, car, dog, bus, fish, airplane, boat, and ball. Mrs. Monsees suggests that the clinician should obtain a small toy for each of the test words. The child must know the names of these toys and must have established sufficient auditory patterns to recognize them by hearing alone. With the child seated at a table in front of the loudspeaker, or with headphones, the person conducting the test names each toy as it is placed on the table to make certain that the child knows what it is called. As the child points to the various toys, in response to commands from the recording, the clinician reduces the intensity of the recording until the threshold measurement is obtained.

The author found this test particularly useful with children three to eight years of age who did not have sufficient vocabulary to recognize or repeat the more difficult words on the CID Spondaic Word record. The test was found valuable as a means of verifying the results obtained by pure tone audiometry.

Side II—Numbers

The test consists of pairs of numbers such as "9-4," "6-5," etc. The child should be instructed to repeat the numbers as long as he is able to hear them. The attenuator of the audiometer is used to decrease intensity until the threshold measurement is attained. The numbers test may be used to supplement the toys test, or may be used in place of it. In some cases it is useful with adults when a foreign language barrier or a severe loss of auditory discrimination prevents use of the Spondaic Word tests.

Noise Bands

A band of random noise appears at the end of each side of the recording. Apart from its use for calibrating the audiometer for speech reception tests, it may be used for other purposes. One is to obtain a measurement of the level at which the child is aware of sound, in cases where no auditory patterns have been established, in order to obtain a rough estimate of the hearing loss. It may also be used with a headphone for masking, or with the loudspeaker for the performance-in-noise tests in hearing aid evaluation.

Busman Abroad

HARRIET MONTAGUE

SOME years ago, I made a trip through the Western and Middle Western parts of the United States, visiting schools for the deaf, parents of deaf children and groups of hard of hearing adults. I wrote an account of my adventures for the VOLTA REVIEW under the title "Busman's Holiday." Now I have been on another busman's holiday, this time abroad, and have been warmed, enlightened and stimulated by the remarkable people who are working in one way or another, in the fields of education or medicine or social service, to deal with the problems created by deafness. I have found, too, that the problems are pretty much the same everywhere, no matter what the language used.

I visited 10 countries in Europe, traveling alone by plane or train, and found that a deaf person can get along quite well in foreign lands, often better than in his own country, for if he makes a mistake people just think he doesn't know the language and fix things up for him without talking. It is often very convenient.

Many of the persons I met could speak good English. Others could read and write English but could not understand it when spoken. With the latter, I often carried on very interesting written conversations in English. I had the same experience with French, which I read easily but cannot lipread. In France, most of my conversations were on paper, and in Germany I got along very well with a mixture of spoken and written German and English. On the whole, the language differences were no great handicap, and I thoroughly enjoyed picking up words in Norwegian or Danish or Finnish, particularly Finnish, where the long words and double vowels were fascinating to me.

I met a number of deaf persons who were bilingual, and believe that if I had an opportunity to remain long enough in a foreign country I could learn enough of the language to lipread it to some extent. I was quite pleased, one afternoon in Frankfurt, when a girl on a bicycle drew up to the curb and asked me a question in German. All I got of what she said were two words, *Bitte* (please) and *Bahnhof* (railway station). That was enough, as I happened to know where the *Bahnhof* was and was able to direct her in pantomime with a word or two of German thrown in.

Journey Planned Personally

I planned my journey myself, guided largely by my personal interest in various individuals in the different countries who had either visited the John Tracy Clinic in Los Angeles or had subscribed to the correspondence course for parents of deaf children issued by the Clinic. I was not exactly the official representative of the Clinic, as I traveled under my own auspices, but everywhere I was offered the utmost kindness and consideration, as one who brought a message from workers for the deaf in the United States to those in Europe.

My method of planning the trip, although it sounds haphazard, had a certain order. I just sat down with an atlas open on my lap, and put my forefinger on various places on the map of Europe where there were people I wanted to see. There were a lot of them. I started with Oslo because I have many friends there — mothers who have had the Tracy Correspondence Course and have been writing to me for years. I said to myself, "I must go to Oslo because I want to meet Mr. and Mrs. Mellbye and Aage, and Mrs. Gloslie, and all the other mothers. And Dr. Leegard in Oslo was the first person in Europe who wrote about the correspondence course. I want to see the Malmbak twins in Copenhagen and visit Mr. Albert's school of lipreading. There are a lot of interesting people in Finland, and I'd like to visit Professor Meurman's clinic at the hospital in Helsinki. I must see Herr Kolibius in Düsseldorf, and there are so many in England I want to meet."

Mrs. Montague, who directs the Correspondence Course of the John Tracy Clinic, is well known to readers of the *Volta Review*.

The list grew longer and longer as my finger moved over the map. The route, when I had it lined up, went like this: Oslo, Stockholm, Helsinki, Kuopio, Copenhagen, Frankfurt, Düsseldorf, Brussels, Lucerne, Lausanne, Geneva, Avignon, Toulouse, Pau, Paris, London, Manchester, Edinburg, Glasgow. And that is approximately the route I followed, with a few changes, mostly occasioned by the strike in France.

I turned my itinerary over to a friend of mine in Los Angeles, Dean Stockman, who has a travel agency, and he fixed things up for me. He made a wonderful plan with all the details filled in. It worked out surprisingly well. Now and then there was a slip-up, of course, but for the most part things went smoothly. The agency bought all transportation, made all reservations for trains and planes, paid for all hotel rooms, with continental breakfast included, and all sight seeing tours.

Individuality vs. the Package Deal

This sort of package deal may sound cut and dried, but it saves a lot of time and nervous energy, to say nothing of uncertainty in regard to hotel rooms. There is still plenty of the excitement and surprise of travel, and I never could have found for myself, even with the *Guide Michelin* at hand, such a succession of delightfully satisfactory hotels as the agency found for me. There was the Hotel Balances in Lucerne, where I had a room with a balcony overlooking the Reuss River, with the Alps as stupendous background. I ate breakfast on the balcony every morning. In Paris, I was in the Hotel du Louvre, right in the midst of things, and here again I had a balcony from which I could look straight up the Avenue de l'Opera and beyond to the heights of Montmartre and the turrets and minarets of Sacre Coeur. In London, the Hotel Rubens was right around the corner from Buckingham Palace, and I could trot over after breakfast and stand glued to the fence watching the changing of the guard.

In Oslo, I did not say in a hotel. I was swept into Norway on a wave of friendliness, cordial greetings and bouquets. At the airport were Mr. and Mrs. Mellbye, who had used our correspondence course for their little boy; Greta Hoffman, a nursery school principal who had spent a year

A Finnish clergyman for the deaf, Pastor Lauri Paunu, talks to a hard of hearing child through a hearing tube. The mother is deaf.

in the U.S., including several weeks at the Tracy Clinic; Oscar Heier, assistant manager of the Associated Railways of Norway, who greeted me with a tremendous bouquet of talisman roses and a welcome from the Norwegian Society for the Hard of Hearing; and Mrs. Louise Holwech, director of social work for the deaf in Norway. It was all very exciting and I was wafted through the passport and immigration control and into a comfortable car which took me to the Mellbyes' beautiful home, high up on the hill over Oslo.

Not even San Francisco can rival Oslo for sheer beauty. Just going up and down the hills by bus or car, or, as on one occasion, by ski lift, provides unforgettable views of the city and the Fjord.

Mrs. Mellbye invited seven mothers who had had the Tracy Correspondence Course to have luncheon at her home, and it was delightful to meet them all. Some spoke English and some had to be interpreted, but we understood one another because we had a common interest. Never have I met so many groups of friendly, intelligent people as those in the Scandinavian countries who are working in the field of deafness. They were all earnest people, but they were fun, too, and their gatherings were lively affairs.

In Norway, until very recently, deaf children have not been admitted to school until the age of seven. The mothers, who had learned how much can be done for a preschool deaf child, were anxious to start a school of their own so that their children, now growing out of the nursery school group, could continue their education un-

til they were old enough to be admitted to one of the schools for the deaf. Some of them had been attending Mrs. Hoffman's nursery school for hearing children, and were ready for more advanced work.

Smörbrod in Scandinavia

We talked about these things over our *Smörbrod*, the open sandwiches which are characteristic of all the Scandinavian countries, and which may appear at any meal either as the *pièce de résistance* or as canapés along with the aperitif. They are of great variety and they are always good. I learned to like them better than American sandwiches.

I had *Smörbrod* again with some of the same mothers when we lunched at Frogner Park. Here I met Mrs. Gloslie, the first mother in Norway to enroll for the correspondence course. She had her daughter, Anne, with her. Anne is now a big girl, eight years old, reading lips fluently and using considerable speech. Her lipreading especially is so casual and quick that it is hard to realize she has a marked hearing loss. She does have usable hearing, but her good command of language is due to her mother's patient work through the years.

Frogner Park is one of the sights of Oslo, chiefly because of the great collection of statues by the sculptor Vigeland. On both sides of the bridge that spans the river there are many figures expressing emotion of one kind or another—anger, fear, hate, desperation, or fierce determination, expressed in one group by the determination of a woman to get her man regardless of whether he is interested or not. She has him around the neck with a strangle hold. Anger is expressed by a little baby boy, about two years old, just as mad as he can be and stamping his feet with rage. It was strange to walk through the wood beyond the restaurant and come suddenly upon an entirely different piece of sculpture, a copy of Borglum's great head of Lincoln, with some words from the Gettysburg address in English. It was a gift from the people of South Dakota to the people of Norway, and it aroused my own emotion as none of the other pieces did.

Looking back at Norway, my week there seems to have been a succession of luncheons and dinners. There was dinner at "Dronningen," the great restaurant out in the middle of the Oslo Fjord. There was luncheon at Frognerseteren, the famous sports restaurant, with the Association of Friends of the Deaf, a group of otologists, teachers and others interested in helping deaf children. There was dinner at Professor Leegard's home, after I had made a broadcast in English which he translated into Norwegian, telling about the educational needs of the preschool deaf child. Still another luncheon was given me by a group of the League for the Hard of Hearing at Sundvollen, a restaurant near the great ski run at Turifjord. Greta Hoffmann and I went up the ski lift, a terrifying trip of over 5000 feet. The view is awe-inspiring, but I had to keep looking out over the Fjord and not look straight down. The people at the luncheon were mostly hard of hearing adults who are working not only for the welfare of the hard of hearing but for preschool deaf and hard of hearing children, too, and they are helping to raise money for a nursery school.

A Home for the Deaf

Pastor Vogt Svendsen, the son of the famous Norwegian clergyman for the deaf, Bonnevi Svendsen, and the latter's sister,

"Sukke," the home for the aged and infirm deaf at Andebu, Norway.

Mrs. Holwech, head of social work for the deaf in Norway, drove me to visit two schools, Asgardstrand and Homestrand, and on to "*Sukke*," a home for the deaf at Andebu, where we spent the night. *Sukke* cares for many aged deaf persons as well as for the subnormal deaf, and it is a very beautiful and interesting place. Originally the home of a wealthy Norwegian industrialist, who built it for a summer resi-

dence, it has all the most attractive features of a traditional Norwegian farmhouse—large rooms, great fireplaces, built-in wooden beds, painted woodwork, a stairway with carved balustrade. There is a large farm with dairy, hogs, pastures, fruit trees and vegetable gardens, cared for by the adult deaf who are able to work. There are large, comfortable dormitories and recreation rooms, and it is all maintained by the state. It was especially interesting to me as we have nothing like it in the United States, where all the homes for the aged and infirm deaf are maintained by organizations of the deaf themselves.

A Finnish mother talks to her deaf child through an amplifier.

In Stockholm, I was glad to meet Miss Marta Berg, a leader among the hard of hearing, who has translated the Tracy Correspondence Course into Swedish for the mothers in Sweden and for the Swedish speaking mothers in Finland. In the Scandinavian countries, as in the United States, groups of the hard of hearing are making a great effort to aid preschool children with hearing losses, and in each country it is the organization for adult hard of hearing that has sponsored the mimeographing and distribution of the correspondence course.

At the Karolinska Hospital, Dr. Lennart Holmgren showed me around the very fine audiology clinic. He is much interested in parent education and wants to establish in Stockholm a service similar to that offered by the Tracy Clinic. Dr. Holmgren took me to the school for the deaf at Manilla, a suburb of Stockholm, where Pastor Nils Malm, the superintendent of the school, showed me about. Here, as elsewhere, I was deeply impressed with the combination of the old and the new. The building was old. In each room there was still the great white porcelain stove, towering in the corner, although the school long ago installed central heating. I liked the stoves because they were so picturesque, but I could easily imagine the labor involved in feeding 50 of them every day. Pastor Malm was superintending their removal as fast as possible. By way of contrast, he showed me the very fine hearing equipment installed in several of the school rooms for acoustical training. In Dr. Holmgren's office at the hospital was a chart showing the different vowel values and different consonant pronunciation in the many different dialects of Sweden. With so many dialects, it is amazing that they still manage to teach speech to the deaf.

Conference in Helsinki

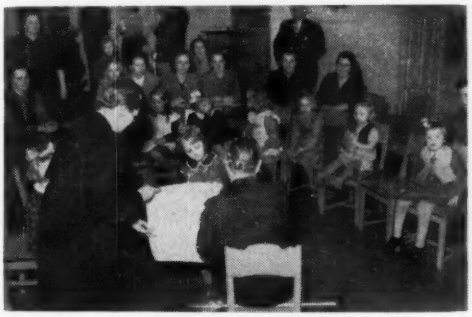
From Stockholm I flew to Helsinki, and there again was swept into an eager group of persons working for the deaf and interested in the deaf — teachers, clergymen, otologists, social workers and parents of deaf children. I was taken to a meeting of this group before whom I was to speak; but first I was interviewed by four reporters, three of them talking Finnish and one talking Swedish, with a young girl to interpret both languages. Considering the difficulties, it was surprising what good, clear stories they all managed to write. Afterwards I stood before the group for an hour and a half, talking and answering questions. I would give a sentence at a time in English, and wait while it was translated. I have never had a more attentive or interested audience. There were representatives of several federations working for deaf children—the Central Federation of Congregational Work of the Finnish Church, and De Dövas Val, the organization for the Swedish-speaking deaf. Inspector Nülo Kotilainen from the Social Ministry was there, and Inspector Oskari Hickkala from the Board of Education; also Professor Yrjö Meurman, director of the Oto-Laryngological Clinic at the University Hospital. The next day Professor Meurman showed me around the very fine audiological department at the clinic, and then drove a group of us to his country home for coffee. We had coffee under the trees by the lake, and some of the party

went swimming. All the Finns, big and little, swim as easily as they walk.

It was most interesting to meet the Reverend Lauri Paunu and his wife, with whom I had been corresponding for a long time. Mr. Paunu was largely instrumental in distributing the Tracy Correspondence Course among parents of deaf children in Finland. As pastor for the deaf in a large area, he travels a great deal and has contact with many of the adult deaf, besides meeting and advising parents of young deaf children. He is especially interested in a movement to admit preschool deaf children to nursery schools with hearing children.

After two full days in Helsinki, I flew to Kuopio, a city much farther north, where I had another rousing welcome. Mr. and Mrs. Köyste, who have used our correspondence course for their little boy, Pertti, and have done a wonderful job training him, especially in lipreading, came all the way out to the airport to meet me. They showed me the greatest kindness during the two days I spent in Kuopio. I visited their home and watched Pertti do his language exercises, being particularly impressed with the way he could lipread the long Finnish words.

It was most pleasant to meet again Anna Liissa Martinnen, who visited the Tracy Clinic in the course of her ten months' stay in the United States. She is now Mrs. Lehtinnen, as she has married the headmaster of the school for the deaf where she teaches. I was greatly interested in seeing the school, and was sorry I had to view it during vacation when there were no children about. At Mrs. Lehtinnen's home, I met her mother and brother, who spoke English. I enjoyed trying to pronounce some of the long Finnish names, and helping this handsome young man with some of his English construction. Once he put his finger in his mouth and said, "It hurts me." I thought he was telling me he had the toothache, but what he meant was that it was difficult for him to shape his mouth to form English sounds. I was delighted when



A group of mothers and deaf children in Turku, Finland, who are working with a Finnish translation of the Tracy Correspondence Course.

he began to sing, and to my astonishment I found that the song was "My Bonnie Lies Over the Ocean." It is many, many years since I have heard that song, much less sung it, but the tune came back to me perfectly, and I joined in with him. Never did I expect to sing that song with a Finnish soldier over a coffee table in a Finnish home.

My last day in Finland was marked by great expressions of kindness. I had to leave Kuopio very early in the morning, as I had to make the long flight to Copenhagen, with stops at Helsinki and Stockholm. Mr. and Mrs. Köyste came to see me off, and as the hotel did not furnish breakfast that early, they brought me tea and sandwiches. And in Helsinki Mr. and Mrs. Paunu came to see me at the airport, bringing a box of candy and a doll dressed in Finnish costume.

In Copenhagen, I had another fine welcome, but I will tell about that next time.

(Editor's note: In the December issue of the VOLTA REVIEW *Mrs. Montague will complete the story of her trip abroad.)*

A Reminder!

Make plans now to attend the 1954 Summer Meeting of the Alexander Graham Bell Association for the Deaf, Inc. The Dates—June 14-19, 1954. The Place—Central Institute for the Deaf, St. Louis.

Needs and Objectives in Teaching Arithmetic to the Deaf

THOMAS H. POULOS

EDUCATORS and other individuals working with the deaf realize the tremendous challenge which confronts them when planning the educational program for a deaf child. Comparisons of the deaf with hearing children have indicated differences which have influenced approaches to the education of the hearing-handicapped child. In the many studies that have been made, the deaf have been shown to be retarded in educational achievement. In terms of years, it has been shown to be about three or four years' retardation. On the Reamer Survey and that of the National Research Council, for example, the 13 year old deaf scored a little higher than the level of third grade hearing children. The norms for the 9, 10 and 11 year old deaf were below those of the third grade. The 14 and 15 year old deaf scored about equal to the norms for the fourth grade.[1]

The deaf are extremely handicapped in understanding language even though a great deal of emphasis is placed upon language teaching in our schools for the deaf. Educational surveys made at the Michigan School for the Deaf during the past two years indicate that the deaf are very proficient in arithmetic computation but their scores for arithmetic reasoning fall much lower—the disparity being as much as four years in many cases.

What is it we are trying to do when we include arithmetic in our curriculum? The arithmetic we should try to teach our pupils is a way to think about quantities. They should react intelligently to such questions as "How much?" "How cheap?" "How many?" or to other questions using degree as "How tall?" "How old?" "How small or big?" "How deep?"

When confronted with questions like the above, they should be able to seek and find appropriate answers. "By means of arithmetic as a way to think, and in the degree that we have learned this way, we (a) recognize number questions and (b) determine their answers."[2]

Problem Magnified

Since the deaf are so greatly handicapped in the understanding of language, this problem of recognizing number questions and determining their answers is magnified. If a child is overwhelmingly retarded in language, he will not be in a position to recognize number questions as would be expected, and as a result will not know how to proceed to find answers to the questions.

During a recent survey given pupils at a large school for the deaf, one of the questions in a test read, "Three girls and five boys went swimming. How many girls in all went swimming?" The answer given in a majority of the cases was eight. The pupils reacted to "How many?" but not to the entire question. The question does not stop with the root of the question only, but with the thought or theme of the question.

The amount of our learning of arithmetic determines the extent of our opportunity to think about the number of things. If we are limited in our learning, we recognize number questions only when they appear in the simpler and less involved situations that we generally encounter. Language growth and the way to think in arithmetic go hand in hand. The child may react to a question form but not to the thought of the question. "How many?" is simple but "How many of a particular group?" is one step beyond the simpler form.

The deaf child's first learning situation with numbers in school comes through

[1]Pintner, R., Eisenson, J., Stanton, M., *The Psychology of the Physically Handicapped.* New York, Appleton-Century-Crofts, Inc., 1941, p.132.

Mr. Poulos is principal of the Michigan School for the Deaf, Flint.

[2]Wheat, H., "The Nature and Sequences of Learning Activities in Arithmetic," *The Fiftieth Yearbook of the National Society for the Study of Education, Part II,* Chicago, The University of Chicago Press, 1951, pp.22-52.

sense training exercises. During these exercises he learns to match cards illustrating circles, squares, objects, etc.

During these exercises, matching of a number of things is included. He learns to match two of one thing to two of the same thing or other things. Little by little in matching pictures to numbers, he learns to count and eventually learns the names of numbers.

In these early exercises the form, "*How many?*" is used often. It is here that he learns to react to that question form.

Number Concepts

The pupil at the beginning of his number thinking handles objects that are concrete. He can see objects; he can see quantity. Number concepts are being established.

When he sees the question, "*How many?*" written or in lipreading, his thinking about numbers will be stimulated. Knowing one, two, three, four, or five, he can determine amount. Having learned one quantity early, it provides him with a basis on which to deal with a quantity in excess of the one previously learned. In other words, what he learns first provides him with something on which to base his later learning. On the basis of what we experienced earlier, we are conditioned or changed in our reactions to what we will encounter later.

This experiencing is very important to successful teaching. It is not a number that is taught but the concept or the meaning of the number. As many classroom activities as possible should be made use of to add to a pupil's meaningful experiences and to strengthen his grasp of number concepts. These experiences provide a pupil with a reservoir of background upon which he can draw to solve problems he encounters.

The role the teacher of the deaf plays in helping her deaf pupils learn to recognize number questions and to react intelligently to them is important. Learning a number question is very much like learning to recognize a printed word. It is necessary for the pupil to have the number question isolated for the moment from the situation of which it normally is a part. In its isolated form, it can be given the consideration it needs. Later, when the pupil has become very familiar with the question, he can deal with it when it is encountered again in its normal situation. In this latter, he will recognize it and be able to withdraw it from its setting if necessary in order to deal with it.[3]

Knowing the question, there remains then to react to it and consequently to find the answer. To make it clear to the pupil how to determine answers to a number question, the teacher needs to do more than just demonstrate and to have the pupil imitate. Instead of merely showing a pupil, he should be guided and helped to find the answers himself.

Where does drill and practice fit in the arithmetic program? To understand fully its effective place, it may be interesting to note first its historical emphasis. In the early 1920's, arithmetic was dominated by drills. The influence of Thorndike's psychology, that of connectionism or stimulus response psychology, biased the outlook on arithmetic. To the followers of his psychology, arithmetic proved a rich field for application. Following Thorndike's law of exercises and the nature of bonds that are formed, drills were emphasized in order to fix these bonds. Knight placed much of his emphasis on mixed drills and the importance of fixing the number fact connections through drills; his influence is still being felt in arithmetic.[4]

Problem Solving Emphasized

Followers of the Gestault psychology emphasized problem solving more than drill on number facts and processes. Gestalt psychologists found both the systematic character of the number system and the mental operations necessary in problem solving. Consequently, with these two strong outlooks on arithmetic, we have two conflicting theories.[5] On the one hand, we have drilling on abstract number facts, on the other we have problem solving in which the concept of "whole" and organization of

[3] *Ibid.*

[4] Buswell, G.T., "The Psychology of Learning in Relation to the Teaching of Arithmetic," *The Fiftieth Yearbook of the National Society for the Study of Education, Part II.* Chicago, The University of Chicago Press, 1951, pp.143-154.

[5] *Ibid.*

parts is most important. Both are invaluable to total teaching of arithmetic.

Our tests and much of our teaching in some of our schools today still maintain the cleavage between drill and problem solving. Where drill and practice on number facts come first, present day psychology suggests the understanding of the need of the process first. Drill is for a purpose and is invaluable to the teacher. If the drill is used to bring out a point, to clarify a meaning, to make something automatic for the children, or to make a usage habit forming, then it is serving a purpose. But when a drill or device is used purely because it is there and its purpose is not kept in mind, then its value in meaningful teaching is lost.[6]

Intended Meanings

In dealing with this problem of making arithmetic meaningful, questions have been raised as to what kind of meanings are intended. Some feel that meaningful arithmetic is its application to social situations while others had in mind mathematical meanings. Both meanings are intended.[7] The former was already discussed earlier. The latter is involved, for example, as concerns helping pupils know when to perform any of the fundamental operations.

Teaching meaningful arithmetic does not eliminate the need for practice but places practice in its rightful sequence. It is important to have drill only after pupils understand what is meant by the operation. The amount of practice that is necessary will then be greatly cut down.

Distribute rather than concentrate practice of skills. The length of practice periods should be adjusted according to the age of the pupils. After a child has apparently mastered a skill it should be reviewed frequently to help him retain it. Any repetitions that are made in this frequent review should be in as many meaningful situations as possible.

Though we have this traditional separation of computation and problem solving, both are essential to a successful fulfilment of the objectives of a total arithmetic program. Children are taught to compute in order that they may be able to solve problems. These problems are not necessarily those that they encounter in their arithmetic books but problems of their everyday living. These latter include such simple ones as Billy being interested in buying some candy or an ice cream cone or more complicated problems involved in helping plan a classroom party.

Problem Solving

Problem solving should be commensurate with the child's ability. If a task is too simple, there is no challenge. By the same token, if a task is too difficult, the child loses interest, becomes careless and may make wild guesses. If work is at his level, his attention and interest will be maintained and his learning will be motivated.

Another point to remember in maintaining a meaningful program in arithmetic is to increase the child's power to recognize and read the words he will encounter in arithmetical problems. If a deaf child understands the meanings of the words composing the number problems, he can proceed with the problem at hand. This aspect of the problem of arithmetic for the deaf is one of prime importance. It has been found in studies that have been made, and particularly in a study completed at the Michigan School, that the deaf showed proficiency in computations in line with the grade level of achievement of hearing children; yet, in arithmetic reasoning or solving of word problems, they fell far below this level. Their extreme language handicap may explain this deficiency; yet, were they to understand the meaning of the words involved in these problems, the arithmetical computation which follows as a result of knowing what the problem is, would be a simple matter. Vocabulary build-up, therefore, is essential to maintaining a successful program in arithmetic.

Basic Terms

This vocabulary should include not only a complete understanding of the question forms as they are taught in other subjects and comparative terms as used therein, but should also include as a minimum or basic

[6]Poulos, T.H., "Is Our Teaching Meaningful?" *American Annals of the Deaf*, Vol. 98 (March, 1953), p.255.
[7]Wheat, *op.cit.*

list the following terms as suggested by Kirk and Johnson[8] relating to:

(1) Size such as: big, small, same.

(2) Money such as: penny, cent, nickel, dime, quarter, half dollar, dollar.

(3) Weights and liquid measurement.

(4) Length and distance such as: inch, foot, yard, far or near, long or short, mile, block.

(5) Amount such as: more, less, some, none, twice, each, enough, many, few, pair, part of, half of, same as.

(6) Time such as: day, week, month, year, hour, minute, on time, late, early, soon, A.M. and P.M.

(7) Comparison such as: the same as, smaller than, larger than, longer, shorter, higher, lower, lighter, heavier.

(8) Business terms such as: bill, rent, buy, lay-away, charge, due, sell, change, exchange, spend, price, time payment, down payment, interest, carrying charge, sale.

(9) direction such as: left, right, up, down.

Deaf children need many interesting visual objects to help them to understand the meaning of counting or any of the fundamental operations. These materials need not be elaborate but can be homemade. For counting, teachers have made or purchased blocks, paper dolls, cardboard money, and the like. For measuring, rulers or other measuring devices should actually be used. As much as possible, arithmetic should be taught as a living arithmetic. Films and filmstrips as well as other projected materials have been effective in vitalizing the arithmetic and other programs. In a recent study by Perle Rose,[9] use of projected materials in beginning reading has proven very effective in teaching the deaf. Its effectiveness in reading suggests this medium as a supplemental means of teaching the vocabulary of arithmetic. Lists of films and filmstrips dealing with children's use of numbers are available from film libraries.

Other visual aids available commercially include charts, per cent boards, fraction blocks, beads, clock faces, etc. All of these add interest to the study of arithmetic.

All in all, if we as teachers of the deaf maintain an effective apportionment between computations and problem solving in our arithmetic work with the deaf, if we cross lines into other teaching areas and utilize number problems in these areas as well as in arithmetic, if we increase the working vocabulary of the deaf so that words they encounter in their problems will have meaning, then will our program be meaningful and the success of our program realized.

[8]Kirk, S.H. and Johnson, G.O., *Education of the Mentally Retarded.* New York, Houghton Mifflin Company. 1951, p.283.

[9]Rose, P.E., *The Use of Projected Materials in Teaching Beginning Reading to Deaf Children,* Thesis, Ed.M. Austin, University of Texas, 1950.

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THE PARENTS TALK IT OVER

Find the Channel of Interest

(Lynn was 2 years, 3 months old when her mother wrote. She has a 70-75 db hearing loss.)

I remember when Lynn would not object and color match and just wanted to play. The ability is there, you just have to find her channel of interest. I showed Lynn the yellowed leaves on the morning glories and she pulled them off . . . never pulling a green one . . . so I knew her sense of color was O.K. And she put the oranges and lemons and baby food jars away after shopping, so her matching sense was there. Sometimes the formal lessons were complete fiascos but just the ritual of a lesson at a certain time and place has been proven very helpful with her. Now she is willing to sit at a table and chair for her speech lessons and I am told that the teacher has difficulty with the children never exposed to that type of discipline.

MRS. O.

Going to the Store Is Good Training

(Janet, age 6 at the time this letter was written, has an undetermined amount of usable hearing in her left ear. She was a Rubella baby.)

Janet has improved both in health (she has congenital heart disease too) and in language and lipreading. She constantly amazes me. She speaks in sentences or phrases all the time. I'll admit that sometimes the words are not in their proper sequence but the sentence is there. I don't accept one word from her anymore. I suppose I should have done this long before now but it never occurred to me. If she wants water, I have her say, "I want some water." Also I had been sending her to the store with slips of paper but the thought occurred to me that it would be good training for her to say what she is after. So far it has just been, "I want three ice creams" but I intend to have her get one particular thing each week until I am sure she knows what to say. I think next week I'll start on bread . . . "I want a loaf of bread."

I enrolled Janet in the public school kindergarten, both handicaps notwithstanding. Her teacher tells me that she tries very hard to succeed, that she is happy obedient and self-reliant. Because of her hearing handicap she misses a great deal of language, music and reading, but she always makes the best of a given situation and shows a remarkable spirit. The other children have grown to love her and are always anxious to be of help to her. (That was something I worried a great deal about before she started school. I was afraid the other children would laugh at her.) Once she understands a direction she makes every attempt to follow through.

When I wrote last (nine months ago) Janet was not getting along too well with her brother and sister, who are younger than she, but the John Tracy Clinic has certainly helped there. They have given me some suggestions of constructive things for her to do and the praise I give her has made her feel that she is a very big girl and, therefore, she will give in. She is much easier to handle. Of course, there are still difficulties, but they are soon settled.

I asked Mrs. M. if a deaf child could be taught to play the piano. She replied that if Janet did play it would probably be mechanical and suggested that she take dancing lessons instead. I hesitated to do that before because of her heart condition but she is so improved that doctors assured me it would be all right. Mrs. M. feels that dancing lessons would help Janet to acquire rhythm in her speech.

MRS. A. R.

Reading and Dancing

(Susan, 12, has no usable hearing.)

Susie has been reading avidly for pleasure. We have a mobile library which visits us bimonthly and we also make a weekly trip to the library in town. Susie reads with great speed but with how much understanding I do not know. However I'm keeping my fingers crossed that her interest continues until reading becomes an ingrained habit.

In the confusion of the first day of ballet lessons I had no opportunity to speak

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to the teacher, who is a rather severe taskmaster. Half way through the hour she suddenly grabbed Susie by the shoulders and said, "Listen to me. You're not paying any attention at all. What's the use of my talking if you don't listen." Sitting on the sidelines, practically dissolved in tears, I saw Susie accept her scolding with very good grace and she just said to me, "Please tell my teacher that I'm deaf and can't hear her when her back is turned." So mother learned again that suffering for people is rarely worthwhile—better to use the same energy in some constructive way!

Susie loves dancing and, like most deaf girls I have seen, keeps remarkably good time. She maintains she wants to be in technicolor musical comedies when she grows up (the star, of course), and gives such an excellent pantomime of Betty Grable singing that if silent movies were still the cry she'd do pretty well. I am forced to admit that our standard of culture has gone steadily downhill. There was a time when I took the girls only to hand-picked entertainment. Now they choose their own and a pair of unwilling parents accompany them.

MRS. P.

Auditory Training at Home

(Ricky, age 2½ at the time his mother wrote, has a 60-70 db hearing loss.)

We have purchased an amplifying machine which we use for Ricky's auditory training at home. He is very fond of it and particularly likes music. We recently purchased a wearable hearing aid for him, upon the joint advice and recommendation of his doctor and his teacher at the hearing clinic. At the latter's suggestion we enrolled him in a nursery school for hearing children. The teacher at the school, aware of Ricky's deafness, said she would be happy to give him a try and now says he is doing very well and seems to be a happy, well-adjusted child. Since he is in school all morning and naps in the afternoon, we have about a 45-minute training period just before he goes to bed and he loves it. My husband built a desk to "house" the machine behind locked doors, and Ricky helps open up and assemble the machine, and put it away. Lastly I always have gum drops

or some candy treat as a reward and he looks forward to it. He never lets me forget it either. He is a great source of pleasure and satisfaction to us, handicap and all.

We now have another little boy for adoption. He was four months old when we got him and is now nine months old. Ricky is very fond of his little brother Stevie and plays with him a lot, although sometimes he gets too rough.

MRS. F. S.

Nurses' Aid Work

(Elizabeth was 15 at the time this letter was written. She has no usable hearing.)

The Nurses' Aid work has proved interesting for Elizabeth, and she has pioneered in it as far as deaf girls are concerned. Her scout troop decided upon this work for their service last spring, and took a course in home nursing and then some preparatory instruction from one of the nurses. They serve in a small hospital, where they usually work two at a time folding linen and baby clothes, preparing surgical gloves and dressings, arranging flowers, serving meals to patients, removing trays, etc. I am assured that the girls work well and are really a great help. The nurse in charge told me that she was doubtful at first about taking a deaf girl, but that she would never hesitate again. One incidental benefit for Elizabeth is that she has learned more than I could ever tell her about hospital procedures, has seen patients undergoing a wide variety of treatment, and has seen more new-born infants than I have. Whatever type of hospitalization she may have to undergo in her lifetime, I feel that she will face it with confidence after this experience.

We have the "mixed-up language" problem that so many of you speak of; not so much when she is expressing her own ideas, as in a letter, as when she is trying to write about school subjects which, however well she understands them in general, are not yet part of her own experience. Most of her study seems to be directed toward answering the questions at the end of the chapter (anywhere from 10 to 30 or more of them). I am not sure that I approve of this system of study, but at least it puts

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great pressure on Elizabeth's language development and gives her plenty of practice. She does the work herself and then I go over it to see that it "makes sense." Then she corrects it.

Speech is still the weakest point. Mrs. P. and two or three other people have thought she showed improvement, and perhaps they are right. Her teacher has gone right back to tongue exercises and formation of the basic sounds—the things she did not have enough of when she was small. She certainly can say separate sounds more perfectly now, and seems able to speak clearly and reasonably intelligibly to strangers. But at home she still jabbers on, leaving off word endings and being careless of accent. Fatigue is one factor in this. When Elizabeth gets home in the afternoon she lets down and relaxes. Accent is one thing I have to help her with. I found that she was having difficulty lipreading the four and five syllable spelling words she has now, because she was picturing them with the accents in the wrong places and so didn't recognize them when the teacher dictated.

MRS. L.

Talk!

I think Kenny (age 7) is going to stop people from gesturing and motioning to him. They have told the children at school that they must talk and not sign. . . . When the laundry man came on Saturday he motioned to Kenny to do something and Kenny started in on him. The poor man was dumbfounded. He didn't know what he had done or what Kenny meant, but I happened to be there and explained.

Mrs. R. H.

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NEWS

New Gymnasium

According to the *North Carolinian*, school paper of the North Carolina School for the Deaf, Morganton, a new gymnasium was ready for the opening of this school year and a primary unit is now under construction. Carl E. Rankin, superintendent, reports an enrolment of 402 with approximately 10 more students expected to enter.

First School Paper Received

The Lone Star, published by the Texas School for the Deaf, Austin, was the first school paper for the 1953-54 academic year to arrive at the Volta Bureau. An item of major interest is the report that the 53rd State Legislature had passed and Governor Allan Shivers had signed a bill abolishing the so-called "room and board" law. As a result residential students at the Texas School for the Deaf will not be charged for room and board. Also the Texas State Board of Education has proposed replacing school dormitories with modern cottage-type housing. Legislative action has not yet been taken on this proposal. Roy M. Stelle, school superintendent, reports receiving seven console model television sets as gifts of several posts of District 21, Texas Division of the American Legion. Also, for the third consecutive year, the Jack Stableford Pontiac Agency has loaned the school a new car, equipped with dual controls, for the use of the driver education classes.

ASHA Convention

The 29th annual convention of the American Speech and Hearing Association will be held in New York City on November 23-25, with headquarters at the Hotel New Yorker. A three-day program of sessions has been arranged covering the areas of speech science, audiology, and speech pathology and correction. Dr. S. Richard Silverman, director of the Central Institute for the Deaf, St. Louis, is president of the association.

NOTES

Dr. Bauer Honored

On September 23 Dr. W. W. Bauer, Chicago, received the 1953 Honor Award given by the American Medical Writers' Association. The award is given from time to time "to a nonmember of the association who has made distinguished contributions to medical literature." Dr. Bauer is editor of *Today's Health* and Director of the American Medical Association's Bureau of Health Education.

Misspelled Word Contest

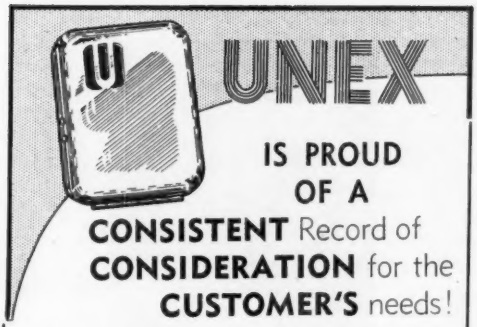
A novel contest was announced in the October 1953 *Calliope*, publication of the Merry-Go-Rounders, a New York City oral club for the deaf. Free admission to a club party was offered to the first five people bringing two misspelled words found in the *Calliope*.

Education of the Deaf in Burma

The School for the Deaf and Dumb, Rangoon, Burma, operated by the Bible Churchmen's Missionary Society, is the only school for the deaf in Burma. The 51 children enrolled represent approximately 1 per cent of the deaf children in the country. More students are being accepted in the teacher training program so that additional deaf children may be accommodated. School authorities are also working to acquaint more parents with the fact that their deaf children can and should be educated. Much progress has been made in this direction, although during the past year a four-year-old boy was withdrawn from school by his parents, upon the advice of a fortuneteller. The School for the Deaf and Dumb is oral and all children are taught in Burmese. Of the 51 pupils enrolled, 42 are resident and 35 are boarded free.

Volta Bureau Exhibit

A large crowd visited the Volta Bureau exhibit at the annual convention and trade show of the International Hearing Aid Association, held in New York City on Sep-



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tember 25-27. Minnie M. Hill, assistant executive secretary of the Volta Bureau, attended the convention and was in charge of the display. The following teachers at the Lexington School for the Deaf, New York City, generously volunteered to assist at the exhibit booth: Mary Deveney, Onnolee Laabs, Barbara Rogers and Mrs. Mary Covell.

This year, for the first time, the program of the convention was expanded to include discussions of improved practices and techniques in the rehabilitation of the hard of hearing, with and without the benefit of amplification; medical aspects and treatment of deafness; future trends, etc. Dr. Clarence D. O'Connor, superintendent of the Lexington School for the Deaf and president of the Alexander Graham Bell Association for the Deaf, spoke on "The Use of Hearing Aids with Deaf Children."

On Saturday evening, September 26, an unrehearsed panel discussion was held on the theme: "The Hard of Hearing Public Meets—The Physician (represented by Dr. Lester L. Coleman); The Clinic Director (represented by Leo Doerfler); The Audiologist (represented by Mary Wood Whitehurst); The Hearing Aid Manufacturer (represented by Leland E. Rosemond); The Hearing Aid Audiologist (represented by Joseph W. Manny."

Record Enrolment

The South Carolina School for the Deaf and Blind, Spartanburg, opened the school year with a registration of 335 children. Dr. W. Laurens Walker, superintendent, reports that this is the largest enrolment in the history of the school. Forty of the children are attending the school for the first time.

Visual Perception of Deaf Children

"A Study of the Visual Perception of Deaf Children" is the title of a 126-page monograph by Dr. Helmer R. Myklebust and Dr. Milton Brutten. The monograph was issued as supplement 105 of *Acta Oto-Laryngologica*, published in Stockholm, Sweden. Although reprint arrangements have not been completed, those interested in the publication should write Mrs. Eva Carson, executive secretary, Audiology Foundation, Box 21, Glenview, Ill.